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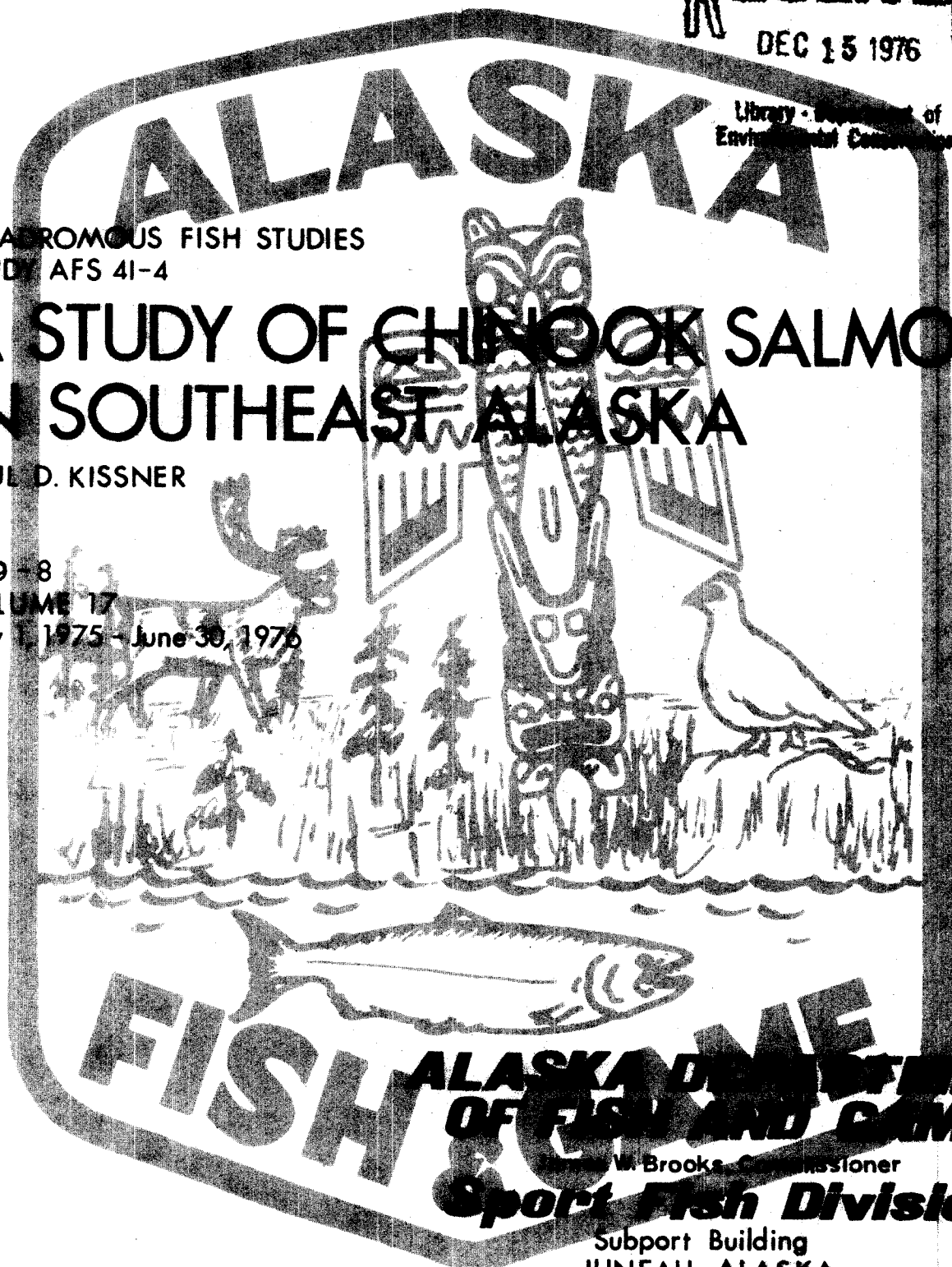
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A STUDY OF CHINOOK SALMON IN SOUTHEAST ALASKA

PAUL D. KISSNER

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**ALASKA DEPARTMENT
OF FISH AND GAME**

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Sport Fish Division

Support Building
JUNEAU, ALASKA

STATE OF ALASKA

Jay S. Hammond, Governor



Annual Performance Report for

A STUDY OF CHINOOK SALMON
IN SOUTHEAST ALASKA

by

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RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations
of Alaska

Project No.: F-9-8

Study No.: AFS 41 Study Title: A STUDY OF CHINOOK SALMON
IN SOUTHEAST ALASKA

Job No.: AFS 41-4-A Job Title: Development of a Chinook
Salmon Enhancement Program

Period Covered: July 1, 1975 to June 30, 1976.

ABSTRACT

During 1975 approximately 273,000 spring chinook salmon eggs were taken from three populations of native chinook salmon to attempt to establish a brood stock for future enhancement projects in Southeast. Mortality from coagulated yolks in the alevin stage (white-spot disease) and infertility was severe and as of December 31 only 28,500 fry remained.

RECOMMENDATIONS

1. Because of uncertainties associated with all phases of a chinook salmon enhancement program, egg takes from individual stocks should never be of a magnitude to jeopardize the native population.
2. Large scale chinook egg takes should not be attempted until techniques have been developed to handle eggs and fry without excessive loss. In 1976 the Crystal Lake Fish Hatchery should attempt to hatch and rear native chinook on an experimental basis and the number of eggs taken should not exceed 50,000.
3. No chinook eggs should be taken at the present time from the Taku River because of the declining status of the population.
4. No chinook eggs should be taken from the King Salmon River (Admiralty Island) until hatching and rearing techniques have been developed.
5. The 12,000 chinook fry held at the Auke Creek Hatchery should be destroyed because of the possibility of IHN contamination.

OBJECTIVE

1. Develop techniques of enhancing the chinook salmon stocks in inside waters of southeastern Alaska.

TECHNIQUES USED

Spawning chinook salmon were captured by heavy sport fishing gear with weighted treble hooks or lures, set and drift gill nets, and gaffs. Eggs were fertilized by mixing of gametes on site, water-hardened for at least one hour and transported to the Crystal Lake, Auke Creek or Deer Mountain Fish Hatcheries. Samples of ovarian fluid, kidney, spleen and liver were taken from Taku River chinook salmon to test for IHN, IPN and VHS.

FINDINGS

Taku River

Permission was obtained from Environment Canada, Fisheries Service to conduct chinook salmon egg takes on the Nakina and Nahlin rivers, which are the major clearwater chinook salmon spawning tributaries of the Taku River in Northern British Columbia. The purpose of the project was to utilize these stocks to develop a brood stock in Northern Southeast Alaska which in turn could be used for local enhancement projects and thereby shift some of the fishing pressure from the depleted Taku River stock. Genetically this stock may be the most appropriate for local chinook enhancement as racial and tagging studies (Kissner 1973, 1974, 1975) indicate that the marine waters near Juneau are well utilized by local stocks for marine rearing.

Escapement surveys, which were conducted in late July, indicated that spawning runs were extremely weak in both the Nakina and Nahlin rivers so it was decided that removal of eggs for development of a brood stock in another area should not be attempted. A program was therefore developed to take chinook eggs, hatch and rear them at the Crystal Lake Hatchery, and stock the resulting smolts in the area taken to attempt to enhance the native population. The Nakina River was the logical site as it had a more acceptable escapement than the Nahlin River.

An egg take was conducted on the Nakina River during August 1-4, 1975. A total of 211,000 chinook eggs were collected from 42 females captured with heavy sport gear near Grizzly Bar. Timing of the egg take was good as only one green and about ten completely spawned out females were captured.

Samples of chinook salmon ovarian fluid, kidney, spleen and liver were taken by a department pathologist and analyzed by Biometrics, Inc. for IHN, IPN and VHS. All results were negative.

Mortality from white-spot disease and infertility were extremely high at the Crystal Lake Hatchery and as of December 31 only 2,561 fry remained from the 170,000 eggs received.

Of the 41,000 eggs taken to the Auke Creek Hatchery about 12,000 fry remain as of February 1. Sockeye from this system have been found to be IHN positive and since detection of the virus can only be made during an active epidemic in juvenile fish or at the time of spawning in adults it is unknown whether these chinook are carriers of the disease.

The first IHN outbreak in juvenile chinook salmon in Washington was detected in the Lewis River Hatchery in 1973 and upon positive diagnosis the entire lot of 250,000 fish was destroyed. Wood (1974) stated that serious consideration should be given to the destruction of any hatchery chinook population in which IHN appears.

Because of the possibility of this stock straying from Auke Creek into nearby rivers (Simon, 1972) and contaminating the natural population it is felt that this lot of chinook should be destroyed.

King Salmon River

This unique stock of chinook salmon is the only population in Southeast Alaska that has adapted to an island watershed. Genetically it appears promising for artificial propagation as the returning adults spend only two or three weeks in the river before spawning. This may be quite important as many hatcheries in the Pacific Northwest indicate significant mortality associated with prolonged holding of maturing chinook (Johnson 1972).

Four ground and helicopter surveys were made during late June and July to determine entry and spawning timing of maturing chinook salmon (Table 1). Escapement into this system was the lowest on record as only 45 chinook were enumerated during the peak escapement survey (Table 2).

Chinook were captured by driving the fish downstream with a drift gill net and capturing them in that net and in a gill net set below. Over a six hour period only three males and three females were captured. One of the females was spawned out and the other two were partially spent. Hatchery personnel estimated that 3,000 eggs were taken.

A combination of poor escapement and high water conditions encountered during the egg take made this program less than successful.

Mortality from this lot of eggs, which were taken to the Auke Creek Hatchery, was nearly 100%.

Chickamin River

An egg take was conducted on Indian Creek and the South Fork, tributaries of the Chickamin River from August 2 through 10, 1975. Chinook were captured with the aid of heavy sport gear and weighted golf-tee spinners, and approximately 59,000 eggs were taken.

On January 22, 1976, the Crystal Lake Hatchery had only 1960 fry remaining from the 42,000 eggs received. High mortality was caused by "white-spot disease".

Of the 17,000 eggs at the Deer Mountain Hatchery over 12,000 fry remain.

Table 1. Observations on Entry of Chinook Salmon into the King Salmon River (Admiralty Island) during 1975.

<u>Date</u>	<u>Chinook</u>	<u>Remarks</u>
June 27	1	In inter-tidal area
July 16	25	Chinook associated with deep holes none on riffles, two were captured, both prespawners.
July 23	42	Chinook associated with deep holes but starting to edge up on riffles, water low.
July 28	42	Captured 3 males and 3 females, all partially spawned or spent.

Table 2. Escapement of Chinook Salmon into the King Salmon River.

<u>King Salmon River (Admiralty Island)</u>		
<u>Year</u>	<u>Chinook</u>	<u>Method</u>
1961	117	Foot
1971	94	Foot
1972	90	Foot
1973	211	Foot
1974	104	Foot
1975	42	Foot, Helicopter

Discussion

In conducting escapement surveys and egg takes in various locations of Southeast Alaska during the summer of 1975, behavior variations in spawning chinook were noted. In the Nahlin and King Salmon rivers, which are narrow, shallow streams, the spawning fish could not be approached without "spooking" them up or downstream into holding water; while, in the Nakina River, which is typically wide, fast moving and deep, the fish could easily be approached. This behavior variation is probably associated with predation as brown and grizzly bears, Urus arctos which have been observed taking live chinook in the shallow rivers but only carcasses in the Nakina.

Egg takes in a shallow stream system should therefore be very difficult without a weir.

According to researchers and fish culturists at the Fish Cultural Conference in Oregon during December, no one has a positive answer to the cause or causes of yolk coagulation in the alevin stage (Dan Romey, Crystal Lake Hatchery, Personal Communication). It is therefore recommended that only small numbers of chinook eggs be taken for experimental hatching at Crystal Lake and that no large scale chinook egg takes be made until the problem is resolved.

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